

# **DRAFT**

## **CALFED Bay-Delta Program**

### **IDENTIFICATION OF DELTA LEVEE SYSTEM INTEGRITY COMMON PROGRAM ELEMENTS**

The goal for addressing Bay-Delta system vulnerability is to reduce the risk to land use and associated economic activities, water supply, infrastructure, and the ecosystem from catastrophic breaching of Delta levees.

#### **Introduction**

The Delta levee system provides protection to Delta communities, ecosystem, economic activities, existing land use, infrastructure, water supply operations, and water quality. These resources are at risk from failure of the Delta levees and channels. The Delta communities, ecosystem, economic activities, existing land use, and infrastructure are at risk from inundation of Delta islands. Water supply operations, and water quality are at risk from increased salinity intrusion which can be the result of the hydrodynamics set in motion by sudden catastrophic inundation of Delta islands. Improving the integrity of the Delta levee system reduces the risk to multiple resources from the negative impacts of catastrophic failure of Delta levees.

#### **Geographic Scope**

The geographic scope of the CALFED Bay-Delta Program levee system problem area is the legally defined Delta. The relationship between Delta channels, tributaries to the Delta, and upstream watersheds may require undertaking actions within the geographic solution area to resolve Delta levee system problems.

#### **Implementation Strategy**

The Program's goal for improving the reliability of the Delta levee system is addressed by implementation of the Delta Levee System Integrity Common Program. The Common Program uses a strategy of identifying improvement actions, research actions, and funding actions to address the risk for multiple resources protected by the existing Delta levee system. In most cases, problems are well understood and the actions to improve conditions are clear. In some cases, the understanding is not sufficient to warrant full-scale implementation of proposed actions. Additional research is needed to identify potential solutions to improve the Delta levee system to continue protection for multiple

resource benefits. Implementation of the Common Program will require reliable, long-term funding to reduce the risk to land use and associated economic activities, water supply, infrastructure, and the ecosystem from catastrophic failure of the Delta levee system.

### **Common Program Elements**

The specific elements of the Delta Levee System Integrity Common Program include Delta Levee Base Level Funding Plan, Delta Levee Special Improvement Projects, Delta Island Subsidence Control Plan, Delta Levee Emergency Management Plan, and Delta Levee Seismic Risk Assessment. These improvement actions, research actions, and funding actions are necessary to provide continued protection of valuable habitat, land use, and infrastructure from inundation, and protecting the water supply operations and water quality from saltwater intrusion. These actions will be closely integrated with Ecosystem Restoration Program Plan and Delta conveyance actions to simultaneously reduce system vulnerability, increase ecosystem quality, and protect water quality and water supply reliability.

**Delta Levee Base Level Funding Plan** - This plan will identify base level funding necessary to achieve a minimum federal flood control project levee design criteria for project and non-project levees in the Delta. Program staff will work in conjunction with State and federal agencies, stakeholders and the public defining minimum levee maintenance requirements, minimum design criteria for levee improvements, necessary funding requirements for ongoing levee maintenance and improvements, State, federal and local cost-sharing plan, and a phasing sequence. The levee maintenance requirements and minimum design criteria will provide protection of existing habitat and net long-term improvement consistent with the Ecosystem Restoration Program Plan. A comprehensive cost-sharing plan, based on identified resource needs and costs, will provide equitable distribution among all Delta islands to improve flood protection provided by Delta levees. Potential actions to improve flood protection include seepage and erosion control, increasing physical dimensions of levees, and flood conveyance improvements to safely pass inflows into the Delta. Seepage and erosion control measures may include relocation of irrigation ditches, placement of stone protection, and installation of drainage systems or slurry cut-off walls. Measures for increasing the dimensions of existing levees may include flattening the slopes, constructing stability berms, widening the levee crown, and raising the levee height. Measures for flood conveyance improvements may include enlarging channels, setback levees, and converting islands to bypass systems. These measures to improve levee stability and flood protection within the Delta will be closely integrated with Delta habitat and conveyance improvements to increase Delta levee system reliability and protection of multiple resources within the Delta.

**Delta Levee Special Improvement Projects** - These projects will provide increased flood protection beyond the Delta Levee Base Level Funding Plan for Delta islands which contain attributes with high public benefits. Delta islands protecting water quality, agricultural production, life and personal property, cultural resources, recreation, ecosystem, local and statewide infrastructure, and adjacent islands will be ranked separately for each of these resources. Program staff in coordination with State and federal agencies, stakeholders, and the public will prepare these island rankings for use by policy makers in developing an overall priority plan for Delta Levee Special Improvement Projects. This priority plan will identify the relationships between the resources potentially affected by flooding of each Delta island and phasing sequence of special improvement projects to provide increased flood protection. Potential actions to increase flood protection range from increasing dimensions of existing levees to flood conveyance improvements to safely pass inflows into the Delta. Measures for increasing the dimensions of existing levees may include flattening the slopes, constructing stability berms, widening the levee crown, and raising the levee height. Measures for flood conveyance improvements include enlarging channels, constructing setback levees, construction of cut-off levees, and converting islands to bypass systems. These measures will be closely integrated with Delta habitat and conveyance improvements that simultaneously improves Delta levee system reliability, increase ecosystem quality, and protect water quality and water supply reliability.

**Delta Island Subsidence Control Plan** - This plan will promote reduction of island subsidence to provide long-term reliability of Delta levees. Subsidence rates and depth of organic soils will be evaluated for Delta islands. Program staff in cooperation with State and federal agencies, stakeholders, and the public will use this evaluation to identify actions and a phasing sequence to address island subsidence. Potential actions range from investigation of the effects of Delta island agricultural practices on areas of peat soil and implementation of demonstration projects to reduce continued island subsidence. Measures include using less intrusive agricultural practices, purchasing easements, and investigating shallow flooding of peat soils on Delta islands. These measures will be closely integrated with Delta habitat and conveyance improvements to provide long-term reliability of the Delta levee system.

**Delta Levee Emergency Management Plan** - This plan will identify increased coordination, planning and funding necessary for protecting critical Delta resources as a result of natural disaster. Program staff will work in conjunction with State and federal agencies, interested stakeholders and the public evaluating existing resources and funding and identifying a multi-agency emergency management team, emergency levee events, emergency levee repair and recovery effort criteria, improved surface water data collection and analysis, standardized

work agreements for emergency levee work, and documentation requirements to streamline reimbursements. The emergency management team will be responsible for planning and allocating identified resource needs during an emergency based on defined emergency events, and levee repair and recovery effort criteria. Standardized work agreements and documentation requirements will be used to fund emergency levee repair and recovery efforts. Increased coordination and planning to provide reliable and adequate funding and resources will be implemented in conjunction with habitat and conveyance improvements in order to provide continued protection of critical Delta resources.

**Delta Levee Seismic Risk Assessment** - This assessment will identify the risk to Delta resources during catastrophic seismic events and develop recommendations to improve the stability of Delta levees. Program staff will work in cooperation with State and federal agencies, stakeholders, and the public in preparing an implementation plan to complete this assessment. The implementation plan will include updating seismic risk information, evaluation of Delta levee seismic performance, identify outstanding issues requiring subsequent action, identify cost-effective measures to improve the stability of Delta levees, adapt and coordinate recommendations with other program actions, and enhance coordination between agencies, stakeholders, and the public. Measures to further define the relative risk of catastrophic events and performance of Delta levees include continuation of the Department of Water Resources' Seismic Investigation which consists of: installing strong-motion accelerometers at three to four levee sites in the Delta; creating geologic model for deeper soil deposits; ongoing field and laboratory testing to better determine the static and dynamic properties of organic soils; field and laboratory testing to better determine liquefaction potential; and investigate the potential activity of the Coast Range-Sierra/Nevada Boundary Zone. Measures to improve the seismic stability of Delta levees may include increasing the dimensions of existing levees by flattening the slopes, constructing stability berms, and increasing the levee height. These measures will be closely integrated with habitat and conveyance improvements to increase Delta levee system reliability and protection of multiple resources within the Delta.

The Ecosystem Restoration Program Plan will address Delta Levee Special Habitat Improvements, Levee Associated Habitat, Delta In-Channel Islands, and Beneficial Reuse of Dredge Material formerly included as part of the Delta Levee System Integrity Common Program. In addition, the conveyance/storage elements of the alternatives will address the Delta Recreation element formerly included as part of the Delta Levee System Integrity Common Program. Delta Levee System Integrity Common Program actions would be integrated with Delta habitat and conveyance improvements that simultaneously improve levee system performance, increase ecosystem quality, and protect water quality and water supply reliability.